

time interval, with the occurrence of each pulse burst in time
15 relative to the start of each time interval varying from time
interval to time interval, the amount of said varying being
controlled by said means responsive to an algorithm incorporated
in each transmitter using said unique binary identification code
of that transmitter for preventing synchronization with other
20 transmitters and with ambient periodic resident signals in the
facility;

25 *B/lnr X*
receiver means responsive to said pulse bursts by said
plurality of transmitter means at each of said diverse sites in
said facility for detecting infrared pulse bursts by said
transmitter means; and

central means responsive to said receiver means for
establishing the location of said transmitter means in said
facility.

2 50. The system of claim *49* wherein said transmitter
means includes a microcontroller responsive to said algorithm.

5 *3* 51. The system of claim *49* wherein said means for
transmitting pulse bursts includes a microcontroller having
memory containing said unique binary identification code.

4 52. The system of claim *51* wherein said
10 microcontroller includes microcode to calculate a checksum of
said binary identification code and generates said pulse bursts
which include a start bit, said binary identification code, and
said checksum.

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53. The system of claim 49 wherein said identification code comprises at least 20 binary bits to provide at least 1,048,576 different identification codes.

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54. The system of claim 49 wherein each pulse burst is of about 20 milliseconds in duration.

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55. The system of claim 49 wherein said pulse bursts each occur once in the predetermined time interval of about one second.

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56. The system of claim 49 wherein said receiver means responsive to said pulse bursts includes a microcontroller for executing microcode to establish a valid code burst from received pulse bursts.

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57. The system of claim 49 wherein each pulse of said pulse bursts is transmitted by a 10 microsecond flash of infrared light.

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58. The system of claim 49 wherein said receiver means responsive to code bursts includes a plurality of discrete receivers each having a reception range about a premises with an allowable overlap with the reception range of another of such receivers; each of said receivers being responsive to said pulse bursts to validate said binary identification code and thereby establish presence of said transmitter means within the reception range of a receiver.

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59. The system of claim 58 wherein said central means includes gathering station means for validating outputs from each of said plurality of receivers and forming start and stop events,

5 said start events including the identity of the one receiver of
one transmitter of the said plurality of transmitters, and
when the pulse bursts of such transmitter was detected by such
receiver; said stop event including the identity of the one
receiver of said plurality of said receivers, the unique
10 identification code of the said one transmitter when loss of
reception has occurred within the reception range, and when such
loss of reception occurred.

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60. The system of claim ~~59~~ ¹¹ wherein said gathering
station means includes a plurality of gathering stations
connected by a serial port to a central computer which includes a
storage medium for storing said start and stop events derived
5 from each of said plurality of gathering stations.

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61. The system of claim ~~60~~ ¹² wherein said central
computer includes a plurality of said serial ports, each of said
ports being connected to a plurality of gathering stations for
receiving said start and stop events.

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62. The system of claim ~~61~~ ¹³ wherein said central
computer has a interface including a terminal and a keyboard for
a user to request and receive the location of any of said
transmitter means.

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63. The system of claim ~~62~~ ¹⁴ further including display
means responsive to said central computer for assembling reports,
and means to input commands to said central computer by an
authorized operator to assemble said reports of movements of any

5 of said transmitter means recorded and stored in said storage
medium.

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64. The system of claim ~~63~~¹⁵ for tracking the movements
of hospital personnel and allied hospital equipment, and
interfacing to an existing nurse call hospital system by
providing: that each of said plurality of said transmitter means
5 comprises a portable communication badge worn by allied hospital
personnel, including nurses, and attached to said hospital
equipment; said means for establishing the location including a
receiver installed in each patient room to interface with said
nurse call hospital system; a receiver installed in each patient
room for indicating when said allied hospital personnel wearing
one of the said badges enters the room, and the class of a number
of classes to which the allied hospital personnel belongs; and an
interface between said central computer and said nurse call
hospital system such that location queries entered at terminals
15 of said hospital system are routed to said central computer.

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65. A stationary receiver installable on the premises
of a facility in combination with at least one transmitter means
adapted for movement about said facility with a person, with an
animal or with equipment to allow monitoring of such transmitter
means within any of diverse sites in the facility, said
transmitter means including infrared emitter means controlled by
controller means for emitting infrared pulses, an algorithm
unique to and with that transmitter means for controlling said
controller means for producing emissions of infrared pulse bursts

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by said infrared emitting means for defining a unique binary identification code at diverse times during each of predetermined time intervals, said algorithm controlling said controller means for causing each pulse burst in each successive time interval relative to the start of each of the successive time intervals to occur differently from time interval to time interval, said stationary receiver including means for detecting infrared transmissions of said pulse bursts and means responsive to said means for detecting for producing an electrical signal identifying said transmitter means.

18 66. The stationary receiver of claim *65* wherein said pulse bursts include a pulse position scheme to represent at least two binary bits of the identification code with one pulse for reducing the number of pulses required to represent said unique binary identification code.

19 67. The stationary receiver of claim *65* wherein said pulse bursts include an error detection word with said binary identification code and wherein said means for receiving is responsive to said error detection word to insure integrity of reception of pulse bursts.

20 68. The stationary receiver of claim *67* wherein said error detection word is transmitted according to a pulse position scheme wherein at least two binary bits of the error detection word are represented with one pulse.

21 69. The stationary receiver of claim *67* wherein said error detection word is a binary checksum.